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This is it! How do we switch to an electrified transport system?

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In order to achieve our climate goals, we need to electrify our transport. The technology exists and is in place for us to use, but the pace of change is far too slow. What should we do? We need a proactive expansion of the electric grid, new types of collaboration, and we need to highlight good examples of those who have succeeded in the switch to electric transport.

Sweden aims to reduce emissions from the transport sector by 70% by 2030 compared to emission levels from 2011. Several cities and regions also have their own ambitious goals for climate neutrality. In order to achieve these goals, we must both reduce transport demands and invest more in biofuels. However, in the long term it is crucial that we succeed in the electrifying of our transport system in order to both maintain our high quality of life and remain within our planetary boundaries.

What is required?

The technology is ready. The development of batteries is moving quickly, and new electric vehicles are being introduced on the market continually. Many new electrification projects are on-going, including the electrification of busses in Sweden, but the transition to electric vehicles is happening too slowly. What is needed to accelerate the pace of electrification?

1. Proactive network planning

It is critical to proactively expand the electric grid in accordance with well-founded forecasts and set social goals. Otherwise the fast pace of electrification of the transport sector that is needed will not be possible. With a large Swedish generation of electricity and annual net exportation, the main problem is not the amount of electricity produced over the years, but instead it is the challenge of securing access to the right amount of power, i.e. to obtain sufficient electricity through the power grid during the times when the demand is the greatest. These challenges apply to the network on the national, regional, and even local levels. An expansion of the network will be needed in the future to enable new charging infrastructure to be connected to the grid, while at the same time meeting the demands for increased electricity in other aspects of our society. For the expansion of the electric grid to be possible and to be in place when the demand arises, a good understanding of different actors' future demands is necessary. Therefore, it is crucial that different actors communicate their future electricity demands to grid operators.

No one knows for sure exactly how we will reach our climate goals, but with several perspectives from actors from

various sectors of society can we together find a way forward. In this work, it is important to consider the public sectors vision of transportation and use of public space, as well as the electrical grids conditions among other things.

In our work with the City of Stockholm, where we investigated the effects of large-scale electrification of the city's vehicle fleet, we got the opportunity to interview many different actors on the subject. Here, it was emphasized that the forecasts for the future electricity demand made by the grid operators at national and regional level are an important basis for the long-term expansion of the grid. It is crucial that actors communicate their expected future electricity demands to the grid operators so that they obtain accurate forecasts and can operate a proactive electricity grid expansion.

Proactive network planning will be critical to electrify at the rate needed to achieve the climate goals. Without proactive planning amongst the national and regional grid owners, whose processes and permits can take up to several years to pass, there is a greater risk that the transition of electrification will be delayed, and climate targets will be missed. The problems that can be created through a delayed electric grid expansion are fresh in the memory from the problem that Skåne, in the south of Sweden and Stockholm had when companies were denied access to increased power outputs. The problems are now temporarily resolved, but we must be better at managing expectations and organizing demands.

2. New collaborations

A broad group of actors should be involved when everything from private cars and taxis to trucks, ships and machines makes the switch to being electrically operated. This process will require new collaborations. Not only do we need more communication of future demands on the electrical networks to grid operators, but also it is critical that we develop new partnerships between actors and industries that have not previously worked together before to a great extent. With the increase of renewable energy production and with larger variation in production, better balancing of the electrical grid is needed. One possibility is to use vehicular batteries to balance out the network, but this solution requires that the energy and transport sectors collaborate on new ways to learn from each other. Electric companies need to contribute with knowledge on how customers patterns of electricity usage affect the electrical grids as well as provide incentives to their customers to be more flexible in their electricity consumption. Not charging electric vehicles during periods when the network is already strained is a good first step, and with V2G technology (vehicle to grid) more opportunities are created. It is important that both industries together take advantage of the opportunities that digitalization creates.

3. Good examples

Many car owners and businesses are worried that today's electric vehicles do not live up to their needs. This can also include electric taxis, electric delivery trucks, electric busses, electric ships, etc. Common questions include, can my business transportation needs be met with electric vehicles? Will I have enough charging to sort my weekend excursion? How does one even purchase an electric vehicle?

To charge an electric vehicle is not the same as to refuel a vehicle, which creates worry for users who are used to occasionally driving long stretches before stopping to refuel. Drivers will have to learn how new vehicle types work in the field. New conditions require a change in behaviour and new ways of working. In order to make possible these changes, we need to highlight good examples of behavioural change so that it feels possible and within reach for others. More tests need to be done and more good examples should be compiled and shared.

The technology we have today makes possible electrification of a large part of transportation. It is now time for us to dare to test it. An important first step to get a better idea of the potential of electrification for an organisation or a municipality, could be to make calculations based on travel survey data or actual mileage for different types of transport, and freight transportation for example.

A look ahead

New technology comes out all the time and battery development and charging possibilities are advancing quickly. New solutions are being developed continually. Sweden, for example, is leading the world in electric roads right now. Series-produced battery-electric trucks and ferries that operate entirely on battery sail for shorter distances, such as Scandline's ferry between Helsingborg and Helsingör, are on the market. At the same time, new ways of thinking about energy storage in urban environments are underway to support and balance the electrical grid. Enough technology is in place, now remains the question of how we will use this knowledge to identify where we should invest and work together to achieve the necessary change in the transport sector.

Contact:

Learn more about our work with the city of Stockholm and our dialog with customers and grid operators (Swedish): Read about electrification of busses in Region Stockholm (English): Would you like to know more about Trivector's work with electrification and renewable energy, you can contact Anna Clark, Business area manager for Climate, Energy and Environment at Anna.Clark@trivector.se or at 010-456 56 23.